Report for Fish and Macroinvertebrate Sampling for Bioassessment Monitoring of West Fork Busseron Creek

Prepared for:

Peabody Energy
Evansville, Indiana

Prepared by:

ENVIRON International Corporation
Denver, Colorado

Date:
September 10, 2010

Project No:
2024989A

ENVIRON

Contents

List of Tables

List of Figures

Executive Summary

Peabody Midwest Mining, LLC (Peabody) has reconstructed a portion of the West Fork Busseron Creek, near Farmersburg, IN, (Sullivan County) in response to mitigation of mining activities for Farmersburg Mine. ENVIRON International Corporation (ENVIRON) conducted a biological stream survey that incorporated fish, benthos, and habitat evaluation specific for the Farmersburg Mine and West Fork Busseron Creek Mitigation (WFBCM) area with a comparison to an upstream reference site located within an undisturbed reach of WFBC. This monitoring event served as an interim status check on stream biota to document recovery and in-stream biological development following stream reconstruction.

Water quality field measurements and selected water chemistry results indicated a slight decrease downstream in concentration of conductivity and all major ions except potassium within the WFBCM. Dissolved oxygen, pH, and temperature showed typical diurnal fluctuation common the exposed stream systems. Habitat evaluations based on the Qualitative Habitat Evaluation Index (QHEI) and USEPA Rapid Bioassessment Protocols (USEPA 1989, 1999) resulted in habitat assessment scores that indicated mid-suboptimal habitat conditions for both the reference and the WFBCM.

A total of 15 different fish species were identified in the WFBCM. Fish survey results indicated a minnow-based assemblage at the reference area compared to a sunfish-based assemblage in the upper portion of the reconstructed reach, and a sunfish and minnow-based assemblage in the lower portion of the reconstructed reach. The fish community was dominated by insectivores and only the largemouth bass represented a top carnivore/predator species at the reference site and the WFBCM. Fish Index of Biotic Integrity (IBI) scores ranged from 42-44 indicating fair biotic status at the reference site and ranged from 40-44 for the WFBCM indicating negligible difference in the fish assemblage between the reference and WFBCM.

The benthic macroinvertebrate survey was conducted at the reference site and both WFBCM sites using the multi-habitat approach with riffle samples being kept separate from vegetation/debris dam samples. A total of 89 different taxonomic entries were identified, which represented specimens from the major aquatic insect groups plus a presence of clams, snails, worms, and crustaceans. Organisms representing the Diptera-Chironomidae (flies and midges) dominated the macroinvertebrate collections at all sites. Macroinvertebrate IBI results based on USEPA (1989), for use with a reference collection, indicated slightly lower biological integrity conditions at both sites within the WFBCM for the riffle samples, and only at the upstream portion of the WFBCM for the vegetation/debris dam samples (IBI score less than 79% of the reference score). The downstream vegetation/debris dam sample was over 100% of the reference IBI score indicating no loss of biological integrity or condition.

Associations between attributes of habitat features, the fish community, and the macroinvertebrate community within the WFBCM indicate typical hydraulic function and biological functions of a healthy stream system are present. A continuation of the functional aspects of the hydrologic pattern in combination with maturity of the channel, bank, and riparian area of the WFBCM will form the basis and future development of fish, benthos, and other aquatic-based communities. Based on the findings of this study, it is believed that over time, the compositional

structure of the fish and benthic macroinvertebrate assemblages will mimic reference conditions and a minnow based community can develop within the WFBCM.

1. Background & Objectives

This monitoring project is to serve as a status check for recruitment and establishment of biota for the reconstructed portion of West Fork Busseron Creek known as the West Fork Busseron Creek Mitigation (WFBCM) area. The WFBCM area is approximately 7,825 feet in length and was constructed in response to mitigation of mining activities for Farmersburg Mine. The stream reconstruction plans incorporated current aspects and understanding of hydrology and stream morphology to enhance the ecological benefits of the stream specific to the gradient and geographical area. ENVIRON conducted a biological stream survey June 29-July 1, 2010 to provide biological information as a temporal benchmark to demonstrate the gradual succession within the mitigation area towards pre-mining conditions.

2. Methods

2.1 General

The stream survey of the WFBCM was based on selected physico-chemical constituents, habitat attributes, and resident biological community parameters for benthic macroinvertebrates, and fish. Survey methods were based on Rankin (1989), IDEM (2006) and U.S. Environmental Protection Agency (USEPA 1989, 1999) for the Qualitative Habitat Evaluation Index (QHEI), and habitat bioassessment, respectively; USEPA (1989, 1999) and Ohio Environmental Protection Agency (OEPA) for benthic macroinvertebrates and fish collection and evaluation.

Field work was conducted by general progression from downstream to upstream, implementing tasks sequentially based on technical considerations. For example, water samples and *in situ* water quality analyses were conducted prior to all field activities so as not to alter water quality due to in-stream activity, fish collections were conducted prior to other activities so as not to disturb fish in preferred habitats, and habitat assessments were conducted after all in-stream activities to best familiarize team members with habitat conditions.

2.2 Sample Locations

ENVIRON personnel toured the reconstruction site on June 29, 2010 to determine most appropriate locations for macroinvertebrate and fish collection. One upstream reference site (WFBCU1) located outside the WFBCM and two downstream sites (WFBCR2 and WFBCR3) within the WFBCM were selected for benthic macroinvertebrate collection (Figure 1). Sites WFBCR2 and WFBCR3 were also used for fish collection with reference conditions represented by fish survey data from immediately below the WFBCM and conducted prior to stream relocation and construction (Three Rivers Environmental 2003).

Site location, corresponding latitude and longitude, was determined with a hand-held GPS. All samples collected were recorded in bound field logbooks to facilitate sample tracking. Labeled water chemistry samples were shipped the same day as collected to one of several Test America analytical laboratories depending upon the suite of analytes to be evaluated. Preserved benthic macroinvertebrate samples were stored with internal and external labels and shipped from the study site to EcoAnalysts, Inc (Moscow, ID) for taxonomic analysis. Sample collection quality assurance and quality control (QA/QC) objectives were met as no samples were lost and all results can be traced back to the correct spatial location of collection.

2.3 Physical/Chemical Parameters

2.3.1 Habitat Quality

Habitat assessments were conducted in the upstream reach, WFBCU1, and downstream segments of WFBCR2 and WFBCR 3 on June 29, 2010. Habitat quality was assessed for the entire 150 meter (m) study reach and was documented using the visual based approach presented in *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers* USEPA 1999. The Indiana Qualitative Habitat Evaluation Index (QHEI) was also determined as a composite of the entire study reach and was based on Qualitative Habitat Evaluation Index (QHEI) Standard Operating Procedure (Document S-001-OWQ-A-BS-06-S-R1 Dec 2006).

2.3.2 Water Quality and Flow

A Horiba Model U-10 multi-probe meter was used for *in situ* water quality at all locations where biological samples and water chemistry samples are collected. Daily calibrations consistent with manufacturers' recommendations were conducted prior to use and following use at the end of the day to verify proper operation and maintain consistency in meter readings.

The following *in situ* parameters were assessed:

- Dissolved Oxygen (mg/L)
- pH (s.u.)
- Conductivity (µmhos/cm)
- Temperature (°C).

Instantaneous discharge was determined by the incremental flow method at the center of each study reach with the aid of a standard top-setting rod and Marsh-McBirney Model 2000 flow meter. A minimum of 10 increments were measured for depth and water velocity across a transect perpendicular to the stream flow, and then combined to determine total instantaneous discharge.

2.4 Biological Survey

2.4.1 Fish

ENVIRON has reviewed a pre-mining fish census report (Three Rivers Environmental 2003) and duplicated the fish survey efforts as much as possible in order to maximize comparison of results. ENVIRON surveyed sites WFBCR2 and WFBCR3 within the WFBCM with battery powered backpack electroshock fishing unit using standard and accepted protocols as follows:

1. One fish survey location was no closer than 30 meters of the downstream terminus of the WFBCM, and the other fish survey location was no closer than 100 ft from the upstream end of the WFBCM.

2. Fish sampling was conducted at each of the two WFBCM sites in a stream reach that was 150 meters in length, which was a minimum of 15 times the wetted width of the stream.
3. An electroshock sampling time of a minimum 40 minutes was the target sampling effort at each site to best match the fishing effort reported by Three Rivers Environmental (2003) at the reference site
4. Standard fish shocking methods were followed to meet data quality objectives of comparable data to previous survey efforts. Block nets were set at the lower and upper ends of the measured reach; shocking proceeded in an upstream direction and all pool, riffle, run, and backwaters were sampled. All attempts were made to maintain captured fish alive in temperature appropriate site water within coolers and holding tanks for analysis. The entire study reach was sampled by electroshocking twice; and all fish were returned to WFBCM area unharmed following specimen analysis and data recording.

2.4.2 Fish Data Collection

The following information was documented on in-house fish survey field forms or field logbook:

1. Site information to include West Fork Busseron Creek, Sullivan County, Indiana, date and time at study reach, and personnel on-site.
2. Sample site information to include GPS coordinates of downstream and upstream ends of stream survey reach, stream length of survey reach, and general stream morphology (average depth, velocity, and instantaneous discharge).
3. Water quality information include pH (s.u.) dissolved oxygen (mg/L), specific conductivity (µmhos/cm), and temperature (°C) upon arrival at the site and at end of day.
4. Water chemistry information to include laboratory alkalinity, laboratory conductivity, total dissolved solids, and the major ionic composition of the water to include calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), bicarbonate (HCO_3), chloride (Cl) and sulfate (SO_4).
5. Fish information to include species identification, enumeration, and length measurements. Fish weights will be taken for at least five fish from each of a representative size class per species (total size classes per species and weights dependent upon capture and number of fish) to facilitate estimation of biomass. All fish captured were identified and enumerated.
6. All fish were inspected for anomalies, deformities, or indications of disease and any such observations were recorded.

2.4.2 Benthic Macroinvertebrates

Benthic macroinvertebrates were collected from within the WFBCM area at locations within the fish survey reach sections, and from an undisturbed reach in West Fork Busseron Creek upstream of the WFBCM. The upstream sample of benthic macroinvertebrates provided an in-stream reference of the benthic community composition and structure for the WFBCM reach. A qualitative multi-habitat sampling scheme was followed that is consistent with several state and federally accepted and approved macroinvertebrate bioassessment sampling methods. Benthic macroinvertebrate sampling within the WFBCM and undisturbed upstream West Fork Busseron Creek site included the following:

1. Benthic macroinvertebrate sampling consisted of kick net and dip net sample collections from representative locations of each of the key habitats in each sample reach. Riffle habitat samples were collected from a 1 square meter area using either a kick net with 500 *u*m mesh for or a D-frame kick net with 500 µm mesh. The D-frame kick net with 500 µm mesh was used for vegetation sweeps and debris dam habitat type sampling. A 3 square meter area of riffle and an equal area estimated for the streamside vegetation/debris dam habitat were sampled in each study reach. The collection of streamside vegetation and woody debris samples was timed to approximate and equal the riffle sampling effort. Vegetation and debris sampling included the collection and shaking of individual debris clumps and dams or sweep samples of material for a minimum of 2 minutes before removing residual material and transferring the remaining material and organisms to labeled sample containers. The number of dip net samples collected from the streamside vegetation and woody debris habitat type were recorded in a bound field logbook.
2. Samples from within the same habitat type were combined as a composite in one quart plastic bottles, and field-preserved with 95 percent ethanol. Thus, there was a riffle sample container, and a vegetation/debris dam sample container for each study reach. All samples were identified by habitat type, sample station and date collected, and contained both internal and external labels.
3. Locational data such as GPS coordinates of the habitat collections, reach name, sample identification, date and time were recorded in the bound field logbook. Photographic records of representative habitat sample types were included.
4. Samples were shipped overnight to EcoAnalysts (Moscow, ID) for taxonomic analysis and metric calculation. Organisms were identified to the species level whenever possible. Benthic community metrics common to bioassessment indices and characterization of the benthic community were calculated.

3. Results

3.1 Physical/Chemical Parameters

3.1.1 Habitat Quality

Habitat assessment scores using the visual based USEPA (1999) habitat assessment score sheets for low gradient streams resulted in a range of habitat scores from 123 to 135 for sites WFBCR3 (reconstructed area) and WFBCU1 (upstream reference area), respectively. Composite QHEI scores, calculated following guidelines of IDEM (2006), for the WFBCM study reaches were 50 for WFBCR3 downstream; 52 for WFBCR2 in the upper portion of the reconstructed zone. The QHEI score was 53 for the WFBCU1 reference area, upstream of the reconstructed zone (Table 1). Habitat metrics values for each evaluation are presented in Attachment 1.

Habitat scores for the USEPA (1999) protocol indicate mid-suboptimal conditions at all three sites. It is important to note that while the USEPA forms were primarily designed to assess habitat quality of natural streams, they were used here because of the Rosgen stream design approach applied during the planning stage of the stream reconstruction. One goal of the Rosgen stream design approach is to re-create a high quality natural hydrologic stream condition. Thus, a successful reconstructed stream should have high values for several metrics that assess conditions of channel sinuosity, flow status, natural stream patterns, and riparian vegetative protection and width. Low metric values within the USEPA habitat assessment were typically assigned to those metrics associated with temporal aspects of stream hydraulics such as epifaunal substrate and cover, substrate characterization, and sediment transport/deposition. Because the WFBCM is relatively young (less than 3 years) it is anticipated that following several years of further hydraulic development and stabilization within the stream channel coincident with continued vegetative development of the riparian zone, the habitat will continue to improve towards optimal conditions.

The QHEI results were consistent with the USEPA habitat assessment with respect to little difference in QHEI score between the reference WFBCU1 area and the two reconstructed study reaches of WFBCM. The average QHEI score of 17 transects in WFBC study during 2003 (prior to reconstruction) was 54.7 (Three Rivers Environmental 2003). The Three Rivers Environmental (2003) sites were located downstream of the bridge over WFBC at County Road 950N. The QHEI scores of 50 and 52 attained for the present study following reconstruction demonstrate habitat conditions are comparable to those initially present prior to reconstruction. In addition, the QHEI scores within the WFBCM agree well and are comparable to the QHEI score of 53 for the upstream WFBCU1 reference area.

3.1.2 Water Quality and Flow

Flow measurements and water quality determinations for dissolved oxygen, temperature, conductivity, and pH measured *in situ* at the sample locations are shown in Table 2. Flow was approximately 4.5 cubic feet per second (cfs) higher in the WFBCM than the 5.25 cfs measured upstream at the WFBCU1 site. Temperature showed a typical pattern of warming during the day at all sites and was generally warmer in the WFBCM than upstream at the WFFCU1 site. Dissolved oxygen concentrations at all sites indicated high oxygen availability to aquatic

organisms, and pH ranged from 7.7 s.u., upstream to 9.0 s.u., at the downstream end of the WFBCM. Both dissolved oxygen and pH showed a range typical of a response to diurnal fluctuations in water temperature.

Analytical results of water chemistry samples collected at all three sampling sites are shown in Table 3. Concentrations of the selected constituents are within the range expected for the stream and site. The data show a slight decline in all constituents downstream, with the highest concentrations determined at the upstream WFBCU1 reference area.

3.2 Biological Survey

3.2.1 Fish

A total of 15 different fish species were identified from the electroshock survey of the WFBCM on June 30 – July 1, 2010. Twelve species were found in the upstream reach at WFBCR2 and 13 species were found at WFBCR3. During this survey, fish species found only at WFBCR1 included steelcolor shiner (3 specimens) and white sucker (10 specimens). Fish species found only in the downstream WFBCR3 reach included two quillback specimens, silverjaw minnow (31 organisms), and a single spotted sunfish. A summary of the fish survey including number and total biomass for each species identified for the WFBCR2 and WFBCR3 study reaches of the reconstructed stream area is shown in Table 4, along with fish survey results conducted near WFBCU1 in 2002 prior to stream reconstruction (Three Rivers Environmental 2003). A listing of individual fish specimens captured along with weights and length data is included in Attachment 2.

The assemblage of fish represented species common to Indiana and frequently encountered in small headwater to moderate sized streams (Simon and Dufour 1997). Sunfish (bluegill, green sunfish, longear sunfish) were the dominant group represented at both the WFBCR2 and WFBCR3 followed by the largemouth bass as a single species and members of the minnow family as a group. The fish assemblage was dominated by insectivore species (10 of the 15 total species encountered) with the largemouth bass representing the only carnivore/piscivore recorded. Evaluation of the feeding strategies for the additional fish species show on Table 4 as reported by Three Rivers Environmental (2003) and not encountered in this study show the same pattern. All additional fish identified by Three Rivers Environmental (2003) were insectivores, except the Mississippi silvery minnow (omnivore), resulting in the largemouth bass being the only carnivore/piscivore encountered in this portion of WFBC prior to and following reconstruction.

Bioassessment results based on the Index of Biotic Integrity (IBI) for fish captured in the reconstructed zone at WFBCR2 and WFBCR3 are shown at the bottom of Table 4 as well as the IBI score. The individual metric values for the IBI based on the fish assemblage at WFBCR2, WFBCR3, and the 2002 samples reported by Three Rivers Environmental (2003) are shown in Table 5. IBI metric values and final IBI scores for WFBCR2 and WFBCR3 were based on protocols in Simon and Dufour (1997) for the Eastern Corn Belt Plain Region in Indiana which includes the Sullivan County area. IBI scores were 44 for WFBCR2 and 40 for WFBCR3 and are nearly identical to scores of 44 (upstream) and 42 (downstream) reported by Three Rivers Environmental (2003) for samples collected prior to stream reconstruction. A comparison of the IBI scores indicates the WFBCM has presently attained the level of biotic

integrity that existed in WFBC prior to stream relocation and construction. Based on Simon and Dufour (1997) IBI scores ranging from 40-44 are rated as Fair, with attributes that include loss of intolerant species, decrease in species number, a highly skewed trophic structure, and the older age classes of top predator may be rare. The assemblage of fish collected at both WFBCR2 and WFBCR3 show these attributes by:

1. A general lack of fish species considered sensitive or intolerant for the Eastern Corn Belt Plain,
2. A skewed trophic structure by a dominance of insectivore species, few omnivores, and a single carnivore,
3. The low total biomass of largemouth bass, the single top predator combined with only two specimens out of 53 attaining adult lengths of 25 and 27 cm, and
4. Low end of the predicted number of species for the region (although sufficient for the maximum metric value).

Similar results were indicated by the Three Rivers Environmental data for 2002 where no largemouth bass were recorded from the "upstream" of County Road 950N and only one largemouth bass specimen, attaining a biomass of 2.9 grams, was reported at the "downstream" site. Based on a length:weight relationship of the largemouth bass specimens captured at WFBCR2 and WFBCR3, a 2.9 gram largemouth bass would be 6.4 cm long and likely not an adult.

3.2.2 Benthic Macroinvertebrates

Benthic macroinvertebrate samples were collected on June 29, 2010 using the multi-habitat sampling approach that resulted in a sample from fast, medium, and slow riffle areas in one container, and vegetation sweeps and debris dam samples in a second container from each of the WFBCU1 (reference), WFBCR2 and WFBCR3 study reaches. A taxonomic listing with enumeration data for each riffle and multi-habitat sample collected from the study reaches is presented in Attachment 2 along with a listing of general community structure and composition metrics for macroinvertebrate samples.

The benthic organisms identified in the collections from WFBC included taxa for all major aquatic insect groups plus mussels and clams (Bivalvia), snails (Gastropods), worms (Annelida) and crustaceans. Specimens represented taxa common to the region and no rare, endangered, or otherwise special status species were encountered. The overall listing the benthic macroinvertebrate organisms identified from WFBC indicates the greatest number of taxa representing the Diptera (flies and midges) especially the chironomids, the Coleoptera (aquatic beetles) and Gastropods (snails). These types of organisms are generally considered tolerant of physical stress and occur in a wide range of water quality conditions. Organisms that are typically considered sensitive to degradation of water quality and unstable or poor habitat conditions were not very diverse, were poorly represented, or absent from the collected samples. For example, these more sensitive organisms would include the EPT taxa consisting of members of Ephemeroptera (three species recorded), Trichoptera (four genera reported) and

Plecoptera (absent). However, the natural low gradient, warm ambient temperatures, and generally sandy and small particle substrate material characteristic of the WFBC watershed would generally favor an assemblage of the more tolerant taxa.

Evaluation of macroinvertebrate data from WFBC was performed with USEPA Protocol III (USEPA 1989), which uses a multimetric index and scoring system to compare a reference benthic assemblage to the benthic assemblage from one or more study sites to determine biotic integrity or impairment status. In this case, the reference assemblage is represented by the WFBCU1 macroinvertebrate samples. The WFBCU1 site is within a forested area of the watershed that has generally been undisturbed and natural for the past 50 years or more (personal communication, Richard Williams Peabody Energy, June 29, 2010). This site is a more appropriate site-specific reference condition for assessing the biotic integrity of the WFBCR2 and WFBCR3 than elsewhere within the same or alternative watershed.

Results of the USEPA (1989) bioassessment method for macroinvertebrates are presented in Table 6 for the composite riffle samples and in Table 7 for the multi-habitat (vegetation sweep and debris dams) composite sample from each study site. Final multi-metric scores for the riffle samples indicated the biotic integrity of the benthic assemblage at WFBCR2 was less than the samples collected at WFBCU1 (reference). The biotic integrity at WFBCR3 was equal to the reference reach, WFBCU1 for the riffle habitat (Table 6). However, final multi-metric scores for the vegetation/debris dam samples indicated the biotic integrity of the benthic assemblage at both reaches within the reconstructed area was less than the biotic integrity indicated by samples from the reference site (Table 7). The biotic index approach is not always sensitive to subtle shifts in taxonomic composition due to habitat differences other physic-chemical attributes. For example, the survey data show the most abundant organism for riffle samples was the caddisfly, *Cheumatopsyche* (Trichoptera), at the reference area; the fly *Pseudochironomus* (Diptera-Chironomidae) at WFBCR2, and the aquatic beetle *Berosus* (Coleoptera) at WFBCR3. The value for the Percent Contribution of the Dominant Taxon metric focuses only the magnitude of the relative abundance data and does not consider the ecological difference between the caddisfly (sensitive) and the Diptera (tolerant).

Results of the macroinvertebrate survey demonstrate that factors, such as invertebrate drift and primary and secondary productivity within the WFBCM, support complete life cycles and redistribution and colonization of aquatic insects. In addition, the rate of development implied by the relative level of biotic integrity determined at WFBCR2 and WFBCR3 is consistent with generally accepted expectations of aquatic insect community recovery within 5-7 years following episodic catastrophic events such as dam failures and floods. Further development of the benthic community can be expected. However, development of the benthic community (and fishery) will be more dependent upon the hydrologic patterns that continue to redistribute movable sediment material to form stable habitats and the progressive maturity of the bank and riparian features of the reconstructed portion of WFBC.

4. Summary

This study focused on the structural aspects of the major biological components of a stream system to demonstrate the successful relocation and construction of a stream reach of WFBC. Key features of fish and benthic macroinvertebrate community structure and composition were subjected to bioassessment techniques using multiple community metrics. The community metrics incorporate autecological information and form a basis for ecological interpretation with respect to health and biological integrity of the stream. Implications from the structural aspects of the biotic communities can also provide insight to various functional aspects of a stream and this association can further demonstrate successful relocation and construction of the WFBCM reach.

Evaluation of the stream morphology and riparian features that support the biological communities of a stream were found to be comparable using the QHEI (IDEM 2006) and USEPA habitat assessment methods. Interpretation of the habitat bioassessment scores indicated the physical condition of all study sites was suboptimal (Table 1). Individual metric values implied a lack of riffle habitat, uniform substrate composition within the riffles, and a general lack of substrate diversity prevented optimal conditions. These same attributes, in addition to a poorly developed bank and riparian buffer zone, prevented optimal conditions within the WFBCM (Attachment 1). Because of the undisturbed nature of the reference area (WFBCU1), a significant change to optimal habitat conditions is unlikely. However, within the reconstructed reach (sites WFBCR2 and WFBCR3) the design features and reclamation efforts applied to the stream and riparian area are in the process of maturing by means of the seasonal hydrologic patterns within the stream channel (hydraulic distribution of sediment and armoring of hard substrates) and growth of seeded and planted vegetation along the banks and riparian area. No differences in water quality or water chemistry between the reference area and the reconstructed area were indentified that would strongly influence the physical habitat (Table 2 and Table 3). Based on the current status, future habitat evaluations are likely to trend towards optimal conditions in the reconstructed portion of WFBC.

Key findings from the biological evaluation using bioassessment techniques for the fish and macroinvertebrate survey data in the WFBCM include the following:

1. Bioassessment results for fish indicate comparable biotic index values of 40 and 44 for the WFBCR3 and WFBCR2 sites, respectively, which overlap the biotic index values of 42 and 44 for the WFBCU1 reference area (Table 5). The biotic index value indicates negligible difference in biotic integrity of the fish assemblage between the reference site and reconstructed stream sites. Common features of the fishery between the reference and reconstructed area include the presence of only the largemouth bass as the single species representing a top carnivore, with nearly all other species being strict insectivores. This represents a skewed trophic structure and is consistent with characteristics of biotic integrity scores in the range of 42-44. Key differences between the fish assemblage at the reference site and reconstructed study sites that are not reflected by the metrics of the biotic index involve distribution and abundance among the fish species encountered. For example, Table 4 shows the fish community at WFBCR2 could be characterized as a sunfish dominated (numerically and biomass contribution) assemblage consisting of bluegill, green sunfish, and longear sunfish; compared to WFBCR3

that would be characterized as a sunfish (bluegill and longear as biomass) and minnow (silverjaw minnow, suckermouth minnow numerically) dominated assemblage; compared to the reference site WFBCU1 that would be considered a minnow dominated fish assemblage (bluntnose minnow, creek chub, and silverjaw minnow). Since sunfish, and especially green sunfish, are known to be good colonizers of new and available habitats, it is likely that as the channel and riparian corridor of the WFBCM develops and matures into a channel with stable riffle substrates, a shift towards a minnow dominated community can be expected.

2. The benthic macroinvertebrate survey indicated colonization, recruitment, and the development of a benthic community has occurred in the WFBCM following stream reconstruction. Taxa present included the major aquatic insect groups in addition to other organisms such as clams, snails, and crustaceans for a total of 89 different taxonomic entities. The benthic community at all sites exhibited a high number of taxa representing flies and midges (Diptera and Chironomids) and aquatic beetles (Coleoptera). However, differences among the reference sites and study sites were present as demonstrated by the shift in taxa of the most dominant organism (see Attachment 2) and indicated by the Community Loss metric for the riffle samples (Table 6). The Community Loss metric value represents the decimal percent of taxa that are not common between the reference WFBCU1 site and the study sites, indicating only 30% of the taxa at WFBCR2 were also found at the reference site while WFBCR3 has approximately 63% of taxa common with WFBCU1. Bioassessment results for the benthic macroinvertebrates indicated the biotic integrity in the WFBCM was not as high as indicated by the benthic community at the WFBCU1 reference area. Other community structure metrics, and evaluation of habitat scores suggest that the lower biotic integrity at sites WFBCR2 and WFBCR3 may be associated with the physical habitat (unstable, and underdeveloped substrates), and the progression of community development. For example, the Shannon Diversity value for the benthic macroinvertebrates assemblages from the riffle habitat is 3.11 at WFBCR2 and 4.04 at WFBCR3 compared to 2.91 at the reference site. Biological diversity is typically higher during a colonization and development period when habitat features are unstable and changing allowing a number of different organisms to be present, compared to later when habitat features are stable and the community structure dynamics have limited the number of organisms to those that are adapted to the existing conditions. The higher diversity values observed in the WFBCM imply the physical nature of the riffles are changing and have yet to stabilize. The diversity of the benthic macroinvertebrates for the vegetation/debris dam samples is similarly related to the available habitat. In this instance, the vegetation/debris dam habitat is relatively absent in the reconstructed area (open channel, few obstructions) as compared to WFBCU1. (closed channel, many obstructions) as shown by photographs in Attachment 3. Differences in diversity in this case are associated with a lack of complexity in the habitat. It is anticipated that the biotic integrity of the benthic macroinvertebrate community will increase in the WFBCM as the stream channel, substrates, and bank/riparian corridor become for mature and stable.

3. The expected increase in biotic integrity for both the fish and benthic macroinvertebrate communities demonstrates an expected response to one of the

functional aspects of a stream system. An important hydraulic function of a stream includes sediment transport and substrate development, especially following episodic disturbances when the channel is new. The current status of the fish and benthic macroinvertebrate communities demonstrate the temporal aspects of seasonal hydrologic patterns in progressively forming more stable substrate and channel features has been occurring since construction. As mentioned above, the continued function of sediment transport and substrate development with the WFBCM is the basis for the progression towards stable riffle habitats and the shift from a sunfish dominated fish community to a minnow dominated community as observed prior to construction.

4. Other key features of streams include biological functions such as energy transfer and carbon processing between biological communities, productivity and respiration rates, decomposition, and nutrient cycling, which work in concert with hydraulic functions. Measurement of these functional aspects was not a target of this investigation. However, features of the biological data that were collected implicate these stream functions occur. The presence of more than one type of biological community representing two major trophic levels (macroinvertebrates as secondary consumers and fish as tertiary consumers) in the absence of a sustained fish stocking program is evidence that biological functions exist and are active in WFBCM. More specifically, a review of the functional metrics for the riffle sample benthic macroinvertebrates (Appendix 2) indicates the assemblage at each of the three sample sites include organisms from all feeding strategies in proportions that provide insight to sources of primary production and carbon processing. For example, differences in the percent abundance of filterers and gatherers among the sites suggest food resources are primarily suspended, small particles of debris that are being transported within the water column (high percentage of filterers) while in the reconstructed reaches the available food resources also exist in or on the surface of the substrates (high percentage of gatherers). A review of the percent contribution of scrapers and shredders suggest that algal growth is moderate in the reference area (low contribution of scrapers), nearly absent at WFBCR2, and likely abundant at WFBCR3. The indications regarding algal growth (primary producers) suggested by the distribution of functional feeding groups corresponds with the habitat metric scores and features at the study sites. The reference site exhibits mature vegetation along the bank and riparian area that provides shade which can limit the development of permanent algae growth in the riffles (low to moderate scraper contribution), the movable substrates and unstable nature of the substrates at WFBCR2 that would severely reduce both the growth and access to algal growth (very low scraper contribution), and the more stable riffle substrate combined with and lack of mature vegetation to provide shade allows greater algal growth at WFBCR3 (high scraper contribution). A review of the percent contribution of scrapers from the multihabitat samples also corresponds with the physical features of the study sites and provides insight regarding the location and sources of primary production by algae growth. The high contribution of scrapers in debris dams at the reference site corresponds with the greater availability of this type of habitat due to inputs of leaves, sticks and debris from the bank and riparian area. The contribution of scrapers at WFBCR2 from the vegetation sweep/debris dam samples is much

greater than observed in the riffles at this site due to the extensive cattail growth within the channel at this site (algae growth attached to the submerged portion of the cattails), while at WFBCR3 no such extensive cattail habitat was present (lowest scraper contribution). Another example demonstrates the biological function addressing transfer of energy/biomass from one trophic level to another. The WFBCM sites studied did not exhibit extensive algae growth at any site implying high inputs or excess nutrient availability does not occur on a sustained basis. This preludes the abundance of certain fish species (central stoneroller, largescale stoneroller, and southern redbelly dace) that are common to small streams in this geographical region (Simone and Dufour 1989). The predominant feeding strategy for the fish assemblage encountered at all WFBC study sites was the category insectivore, which represented 89% of the fish captured at WFBCR2 and 73% of the fish captured at WFBCR3. A balanced biological function of energy/carbon transfer between trophic level is implied by differences in the estimated density of fish at WFBCR2 and WVBCR3 that showed the same pattern for difference in the estimated density of benthic macroinvertebrates from these sites. Site WFBCR2 exhibited higher estimated densities for both fish and macroinvertebrate than were estimated for site WFBCR3. At site WFBCR2 the estimated fish density and combined habitat macroinvertebrate density was 1.05 fish per square meter (fish/M^2) and 2,250 insects/ M^2 compared to 0.79 fish/M^2 and 1,709 insects/ M^2 at WFBCR3. A more appropriate functional evaluation of energy/biomass transfer would be conducted with biomass, but those data were not available. However, what may be simply coincidental given the many factors involved regarding fish size and age, preferences in available diet, and macroinvertebrate life stage, it is interesting to note that the magnitude of change in density from WFBCR2 compared to WFBCR3 for fish (24.7% lower) and for insects (24.0% lower) were nearly identical.

5. References

IDEM. 2006. Qualitative Habitat Evaluation (QHEI) Standard Operating Procedure. Indiana Department of Environmental Management, Office of Water Quality, Assessment Branch, Biological Studies Section. S-0010OWQ-A-BS-06-S-R1.

OEPA. 1989. Biological Criteria for the Protection of Aquatic Life. Vol. III: Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities. Ohio Environmental Protection Agency, Division of Water Quality Planning and Assessment. Columbus OH.

Rankin, E.T. 1989. THe Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application. Ohio Environmental Protection Agency, Division of Water Quality Planning and Assesement, Ecological Assessment Section. Columbus, OH.

Simon, T.P. and R. Dufour. 1997. Development of Index of Biotic Integrity for the Ecoregions of Indiana V. Eastern Corn Belt Plain. U.S. Environmental Protection Agency Region V, Water Division, Watershed and Non-Point Source Branch. Chicago, IL. EPA 905-R-96-004.

Three Rivers Environmental. 2003. Biological Inventory and Substrate Classification in West Fork Busseron Creek, Sullivan County, Indiana. Three Rivers Environmental Assessments. Murphysboro, IL.

USEPA. 1989. Rapid Bioassessment Protocols for Use in Streams and Rivers. Benthic Macroinvertebrates and Fish. U.S. Environmental Protection Agency, Office of Water, Assessment and Watershed Protection Division. Washington D.C. EPA/444/4-89-001.

USEPA. 1999. Rapid Bioassessment Protocols for Use in Streams and Rivers. Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. U.S. Environmental Protection Agency, Office of Water. Washington D.C. EPA 841-B-99-002.

Table 1. West Fork Busseron Creek Habitat Survey Summary

Sample Site	Date	QHEI Score[1]	EPA Score[2]	EPA Score Description
WFBCU1	29-Jun-10	53	135	Mid-Suboptimal
WFBCR2	29-Jun-10	52	127	Mid-Suboptimal
WFBCR3	29-Jun-10	50	123	Mid-Suboptimal

Notes:

1. QHEI scores as per IDEM Draft Qualitative Habitat Evaluation Index Protocol 2006.
2. EPA score as per Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers USEPA 1999

Table 2. West Fork Busseron Creek *In Situ* Field Measurements

Sample Site	Date	Time	Latitude (N)	Longitude (W)	pH (su)	Conductivity (uS)	Dissolved Oxygen (mg/L)	Temperature (˚C)	Instream flow (cfs)
WFBCU1	29-Jun-10	1130	39.2473	87.3644	7.76	690	7.7	27.0	-
	29-Jun-10	1320	39.2477	87.3643	-	-	-	-	5.25
	1-Jul-10	1655			8.42	685	8.5	29.1	-
WFBCR2	29-Jun-10	1415	39.2364	87.3614	8.52	474	8.9	28.7	-
	29-Jun-10	1525			-	-	-	-	9.95
	1-Jul-10	930			8.37	513	8.7	25.3	-
	1-Jul-10	1610			9.15	507	12.2	29.4	-
WFBCR3	29-Jun-10	1720	39.2316	87.3593	8.52	476	8.4	29.7	-
	29-Jun-10	1820			-	-	-	-	9.94
	30-Jun-10	950			8.07	486	8.8	25.3	-
	1-Jul-10	1628			9.06	470	9.9	31.6	-

Notes:
1. Instream flow calculated from instream velocity/depth measurements

Table 3. West Fork Busseron Creek Water Chemistry Analytical Results

Sample Site	Date	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Alkalinity (as $CaCO_3$ mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Hardness[1] (mg/L)	Site-Specific SO_4 Criteria[2] (mg/L)
WFBCU1	1-Jul-10	15.5	217	435	120	57.9	28.2	3.63	35.0	259	1,485
WFBCR2	1-Jul-10	13.0	147	312	97.2	41.1	20.4	3.38	26.1	186	1,119
WFBCR3	1-Jul-10	11.9	136	288	96.3	40.5	19.3	3.45	22.6	180	1,058

Notes:
1. Hardness is calculated from magnesium and calcium concentrations.
2. Calculated using hardness and chloride values according to 37 IAC 2-1-6.

Table 4. West Fork Busseron Creek Fish Survey Results

Common Name	*Genus Species*	ENVIRON				Three Rivers Environmental[1]			
		Site: WFBCR2 W Fk Busseron Cr - Summer 2010		Site: WFBCR3 W Fk Busseron Cr - Summer 2010		Site: "Upstream" W Fk Busseron Cr - Summer 2002		Site: "Downstream" W Fk Busseron Cr - Summer 2002	
		Count	Total Biomass (g)	Count	Total Biomass (g)	Count	Total Biomass (g)	Count	Total Biomass (g)
Blackstripe topminnow	*Fundulus notatus*	3	2.8	10	13	3	2.7	14	12
Bluegill sunfish	*Lepomis macrochirus*	195	8,882	19	506	77	250	27	115
Bluntnose minnow	*Pimephales notatus*	45	77	93	102	155	200	543	294
Creek chub	*Semotilus atromaculatus*	2	1.7	16	18	307	3,356	183	1,976
Green sunfish	*Lepomis cyanellus*	40	362	9	149	189	561	179	290
Largemouth bass	*Micropterus salmoides*	36	607	17	91	-	-	1	2.9
Longear sunfish	*Lepomis megalotis*	67	1,681	37	859	19	189	32	143
Mosquitofish	*Gambusia affinis*	24	9.4	26	9	7	2.1	79	23
Quillback	*Carpiodes cyprinus*	-	-	2	14	-	-	-	-
Silverjaw minnow	*Notropis buccatus*[2]	-	-	31	102	168	292	428	372
Spotted sunfish	*Lepomis punctatus*	-	-	1	23	-	-	-	-
Steelcolor shiner	*Cyprinella whipplei*	3	7.8	-	-	-	-	-	-
Suckermouth minnow	*Phenacobius mirabilis*	62	282	71	203	-	-	-	-
White sucker	*Catostomus commersonii*	10	14	-	-	2	12	16	1,076
Yellow bullhead	*Ameiurus natalis*	27	1,137	24	445	2	19	1	101
Blackside darter	*Percina maculata*	-	-	-	-	4	11	-	-
Central stoneroller	*Campostoma anomalum*	-	-	-	-	77	376	29	135
Ribbon shiner	*Lythrurus fumerus*	-	-	-	-	1	0.6	-	-
Redfin shiner	*Lythrurus umbratilis*	-	-	-	-	14	12	20	9.7
Johnny darter	*Etheostoma nigrum*	-	-	-	-	63	59	107	93
Mississippi silvery minnow	*Hybognathus nuchalis*	-	-	-	-	-	-	3	49
Pirate perch	*Aphredoderus sayanus*	-	-	-	-	1	9.1	-	-
Creek chubsucker	*Erimyzon oblongus*	-	-	-	-	1	1.9	-	-
Total fishing distance (m)		150	-	150	-	135		135	
Total fishing time (s)		2,907	-	3,688	-	2100-2400		2100-2400	
Number of fish per site		514	-	356	-	929		1503	
Number of species per site		12	-	13	-	17	-	15	-
Total Biomass per site (g)		-	13,063	-	2,534	-	4,884	-	4,405
IBI Score			44		40		44		42

Notes:

1. Henry, D. et al. 2003. Biological Inventory and Substrate Classification in West Fork Busseron Creek, Sullian County, Indiana. Three Rivers Environmental.

2. Noted as *Ericymba buccata* in Three Rivers Environmental Report.

Table 5. West Fork Busseron Creek Fish Index of Biotic Integrity Results

Metric	ENVIRON		Three Rivers Environmental[1]	
	Site: WFBCR2 Summer 2010	Site: WFBCR3 Summer 2010	Site: "Upstream" Summer 2002	Site: "Downstream" Summer 2002
Total Number of Species	5	5	5	5
Number of Sunfish Species	3	5	3	3
Number of Sucker Species	1	1	3	1
Number of Minnow Species	3	3	5	5
Number of Sensitive Species	1	1	1	1
% Tolerant Species	5	3	3	3
% Omnivores	5	3	3	3
% Insectivores	5	5	5	5
% Pioneer Species	5	3	3	3
Catch per Unit Effort	5	5	5	5
% Simple Lithophils	1	1	3	3
% DELT Anomolies	5	5	5	5
IBI Score	**44**	**40**	**44**	**42**
Integrity Class	**Fair**	**Fair**	**Fair**	**Fair**

Notes:

1. Henry, D. et al. 2003. Biological Inventory and Substrate Classification in West Fork Busseron Creek, Sullian County, Indiana. Three Rivers Environmental.

Table 6. West Fork Busseron Creek Macroinvertebrate Survey Metric Summary for Riffle Samples
Summer 2010

Benthic Macroinvertebrate Bioassesment Metric (EPA 1989)	Reference - Riffle WFBCU1		Study Sites - Riffle Samples					
			WFBCR2			WFBCR3		
	Metric Value	Score	Metric Value	% of Reference	Metric Score	Metric Value	% of Reference	Metric Score
Taxa Richness[4]	23	6	23	100	6	38	>100	6
Hilsenhoff Biotic Index (modified)[4]	5.67	6	6.65	84.8	4	7.18	79	4
Scrapers:Filter-Collectors Ratio	0.032	6	0.01	31	2	0.73	>100	6
EPT:Chironomid abundance Ratio[4]	2.22	6	0.061	2.7	0	0.79	35.4	2
Percent of Dominant Taxon[4]	47.5	2	34.1	NA[2]	2	14.5	NA[2]	6
EPT Richness[4]	2	2	3	>100	6	6	>100	6
Community Loss Index	0	6	0.69	NA[2]	4	0.37	NA[2]	6
Shredder:Total Organism Ratio	7.7	6	12.3	>100	6	20.9	>100	6
Shannon Diveristy[1]	2.91		3.11			4.04		
Total Metric Score		40			30			42
Percent of Reference Score					75.0			105.0
Biological Condition Category[3]			slight impariment from reference			no impariment from reference		

Notes:

1. Shannon Diversity is not one of the EPA 1989 scoring metrics but is included here because of the common use of this measure.

2. This metric score based on its value and not a comparison to the reference.

3. Based on USEPA 1989 Protocol III bioassessment protocols for benthic macroinvertebrate.

4. Metric also used by IDEM in mIBI determinations. Reference site metric scores adjusted by IDEM scoring criteria to reflect site-specific conditions.

Table 7. West Fork Busseron Creek Macroinvertebrate Survey Metric Summary for Multihabitat Samples
Summer 2010

Benthic Macroinvertebrate Bioassesment Metric (EPA 1989)	Reference WFBCU1		Study Sites - Mulithabitat Samples					
			WFBCR2			WFBCR3		
	Metric Value	Score	Metric Value	% of Reference	Metric Score	Metric Value	% of Reference	Metric Score
Taxa Richness[4]	35	6	28	80	6	22	62.8	4
Hilsenhoff Biotic Index (modified)[4]	6.57	6	7.63	86.1	4	6.07	>100	6
Scrapers:Filter-Collectors Ratio	1.53	6	0.21	13.7	2	0.16	1.06	0
EPT:Chironomid abundance Ratio[4]	0.51	6	0.13	24.6	0	1	>100	6
Percent of Dominant Taxon[4]	19.3	6	29.3	NA[2]	2	37.5	NA[2]	2
EPT Richness[4]	3	2	4	>100	6	4	>100	6
Community Loss Index	0	6	0.89	NA[2]	4	1.22	NA[2]	4
Shredder:Total Organism Ratio	7.1	6	13.4	>100	6	16.7	>100	6
Shannon Diveristy[1]	4.13		3.64			3.26		
Total Metric Score		44			32			34
Percent of Reference Score					72.7			77.3
Biological Condition Category[3]			slight impariment from reference			slight impariment from reference		

Notes:

1. Shannon Diversity is not one of the USEPA 1989 scoring metrics but is included here because of the common use of this measure.
2. This metric score based on its value and not a comparison to the reference.
3. Based on USEPA 1989 Protocol III bioassessment protocols for benthic macroinvertebrate.
4. Metric also used by IDEM in mIBI determinations. Reference site metric scores adjusted by IDEM mIBI scoring criteria to reflect site-specific reference conditions.

Attachment 1
Habitat Metric Values

Attachment 1. Habitat Assessment Data Sheet Metric Score Summary

Metric (possible score)	Site		
	WFBCU1	**WFBCR2**	**WFBCR3**
IDEM Evaluation[1]			
Qualitative Habitat Score (total)	**53**	**52**	**50**
Substrate (20)	5	9	4
In-Stream cover (20)	6	9	8
Channel Morphology (20)	15	12	10
Riparian Zoe & Bank Erosion (10)	9	9	9
Pool/Glide Quality (12)	9	6	9
Riffle/Run Quality (8)	1	0	2
Gradient (10)	8	8	8
Percent Riffle (estimate)	5	30	20
Percent Run (estimate)	85	30	40
Percent Glide (estimate)	0	0	0
Percent Pool (estimate)	10	30	40
USEPA Evaluation[2]			
Total Score	**135**	**127**	**123**
Epifaunal Substrate/Available Cover (20)	8	3	6
Pool Substrate Characterization (20)	9	10	8
Pool Variability (20)	9	12	8
Sediment Deposition (20)	4	8	7
Channel Flow Status (20)	16	19	18
Channel Alteration (20)	19	16	16
Channel Sinuosity (20)	14	15	13
Bank Stability (LB/RB) (10/10)	9/9	7/7	8/8
Vegetative Protection (LB/RB) (10/10)	9/9	6/6	7/6
Riparian Vegetative Zone Width (LB/RB) (10/10)	10/10	9/9	9/9

Notes:

1. IDEM. 2006. Biological Studies Section, Qualitative Habitat Evaluation Index. S-001-A-BS-06-S-R1

2. USEPA. 1989. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Ed.

Attachment 2
Fish Survey Data
Macroinvertebrate Identifications
Macroinvertebrate Metric Suite

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Blackstripe topminnow	*Fundulus notatus*	6.5	2.4		2
Blackstripe topminnow	*Fundulus notatus*	3.5	0.2		2
Blackstripe topminnow	*Fundulus notatus*	3.0	0.2		2
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.0	46.0		1
Bluegill sunfish	*Lepomis macrochirus*	15.0	66.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.3	43.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.1	52.3		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	12.7	35.5		1
Bluegill sunfish	*Lepomis macrochirus*	16.5	87.5	M	1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluegill sunfish	*Lepomis macrochirus*	15.5	75.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.8	62.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.8	56.0		1
Bluegill sunfish	*Lepomis macrochirus*	14.9	61.5		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	36.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	12.2	28.7		1
Bluegill sunfish	*Lepomis macrochirus*	15.2	64.8		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	12.5	377.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		1
Bluegill sunfish	*Lepomis macrochirus*	7.5	5.4		1
Bluegill sunfish	*Lepomis macrochirus*	7.5	5.4		1
Bluegill sunfish	*Lepomis macrochirus*	7.5	5.4		1
Bluegill sunfish	*Lepomis macrochirus*	7.5	5.4		1
Bluegill sunfish	*Lepomis macrochirus*	7.5	5.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	3.0	0.4		1
Bluegill sunfish	*Lepomis macrochirus*	16.0	79		2
Bluegill sunfish	*Lepomis macrochirus*	15.8	78		2
Bluegill sunfish	*Lepomis macrochirus*	15.5	77		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.5	47		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	38		2
Bluegill sunfish	*Lepomis macrochirus*	12.0	30		2
Bluegill sunfish	*Lepomis macrochirus*	11.5	22		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluegill sunfish	*Lepomis macrochirus*	8.0	6.4		2
Bluegill sunfish	*Lepomis macrochirus*	11.1	22		2
Bluegill sunfish	*Lepomis macrochirus*	7.5	6.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	9.0	11.0		2
Bluegill sunfish	*Lepomis macrochirus*	14.3	49		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	33		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	33		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	33		2
Bluegill sunfish	*Lepomis macrochirus*	13.0	33		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	15		2
Bluegill sunfish	*Lepomis macrochirus*	14.5	44.5		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2
Bluegill sunfish	*Lepomis macrochirus*	10.0	16.9		2
Bluegill sunfish	*Lepomis macrochirus*	8.0	7.2		2
Bluegill sunfish	*Lepomis macrochirus*	8.0	7.2		2
Bluegill sunfish	*Lepomis macrochirus*	8.0	7.2		2
Bluegill sunfish	*Lepomis macrochirus*	8.0	7.2		2
Bluegill sunfish	*Lepomis macrochirus*	7.0	6.2		2
Bluegill sunfish	*Lepomis macrochirus*	7.0	6.2		2
Bluegill sunfish	*Lepomis macrochirus*	7.0	6.2		2
Bluegill sunfish	*Lepomis macrochirus*	2.7	0.4		2
Bluegill sunfish	*Lepomis macrochirus*	2.5	0.4		2
Bluntnose minnow	*Pimephales notatus*	8.2	6.3	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	5.5	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	6.5	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	6.5	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	6.5	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	6.5	M	1
Bluntnose minnow	*Pimephales notatus*	8.2	6.5	M	1
Bluntnose minnow	*Pimephales notatus*	6.0	2.0		1
Bluntnose minnow	*Pimephales notatus*	6.0	2.0		1
Bluntnose minnow	*Pimephales notatus*	6.7	2.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluntnose minnow	*Pimephales notatus*	4.0	0.6		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.6		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.0	0.5		1
Bluntnose minnow	*Pimephales notatus*	7.7	4.3		2
Bluntnose minnow	*Pimephales notatus*	7.7	4.3		2
Bluntnose minnow	*Pimephales notatus*	7.0	1.3		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	4.4	0.6		2
Bluntnose minnow	*Pimephales notatus*	3.7	0.3		2
Bluntnose minnow	*Pimephales notatus*	4.1	0.6		2
Bluntnose minnow	*Pimephales notatus*	2.8	0.3		2
Bluntnose minnow	*Pimephales notatus*	3.0	0.2		2
Creek chub	*Semotilus atromaculatu*	4.3	0.8		1
Creek chub	*Semotilus atromaculatu*	5.5	0.9		1
Green sunfish	*Lepomis cyanellus*	12.0	27.6		1
Green sunfish	*Lepomis cyanellus*	13.0	28.2		1
Green sunfish	*Lepomis cyanellus*	12.1	27.0		1
Green sunfish	*Lepomis cyanellus*	10.5	19.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1
Green sunfish	*Lepomis cyanellus*	6.5	5.0		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Green sunfish	*Lepomis cyanellus*	17.5	7.9		1
Green sunfish	*Lepomis cyanellus*	6.0	3.5		1
Green sunfish	*Lepomis cyanellus*	7.0	4.0		1
Green sunfish	*Lepomis cyanellus*	7.0	4.0		1
Green sunfish	*Lepomis cyanellus*	7.0	4.0		1
Green sunfish	*Lepomis cyanellus*	7.0	4.0		1
Green sunfish	*Lepomis cyanellus*	7.0	4.0		1
Green sunfish	*Lepomis cyanellus*	10.0	17.0		1
Green sunfish	*Lepomis cyanellus*	4.5	1.0		1
Green sunfish	*Lepomis cyanellus*	4.5	1.0		1
Green sunfish	*Lepomis cyanellus*	4.5	1.0		1
Green sunfish	*Lepomis cyanellus*	13.5	38.8		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	8.2	11.2		2
Green sunfish	*Lepomis cyanellus*	9.5	12.4		2
Green sunfish	*Lepomis cyanellus*	7.0	5.2		2
Green sunfish	*Lepomis cyanellus*	7.0	5.2		2
Green sunfish	*Lepomis cyanellus*	7.0	5.2		2
Green sunfish	*Lepomis cyanellus*	7.0	5.2		2
Green sunfish	*Lepomis cyanellus*	8.0	9.2		2
Green sunfish	*Lepomis cyanellus*	4.3	2.0		2
Green sunfish	*Lepomis cyanellus*	4.3	2.0		2
Largemouth bass	*Micropterus salmoides*	27.0	247.0		1
Largemouth bass	*Micropterus salmoides*	16.0	45.0		1
Largemouth bass	*Micropterus salmoides*	25.0	191.0		1
Largemouth bass	*Micropterus salmoides*	17.3	59.8		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	6.3	3.0		1
Largemouth bass	*Micropterus salmoides*	6.3	3.0		1
Largemouth bass	*Micropterus salmoides*	6.3	3.0		1
Largemouth bass	*Micropterus salmoides*	6.3	3.0		1
Largemouth bass	*Micropterus salmoides*	6.0	2.4		2
Largemouth bass	*Micropterus salmoides*	6.0	2.4		2
Largemouth bass	*Micropterus salmoides*	6.0	2.4		2
Largemouth bass	*Micropterus salmoides*	6.0	2.4		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	5.5	1.8		2
Largemouth bass	*Micropterus salmoides*	7.0	4.0		2
Largemouth bass	*Micropterus salmoides*	7.0	4.0		2
Largemouth bass	*Micropterus salmoides*	7.0	4.0		2
Largemouth bass	*Micropterus salmoides*	4.2	0.8		2
Longear sunfish	*Lepomis megalotis*	13.2	41.0		1
Longear sunfish	*Lepomis megalotis*	13.6	52.0		1
Longear sunfish	*Lepomis megalotis*	13.4	48.0		1
Longear sunfish	*Lepomis megalotis*	12.7	38.0		1
Longear sunfish	*Lepomis megalotis*	12.7	36.0		1
Longear sunfish	*Lepomis megalotis*	12.0	35.0		1
Longear sunfish	*Lepomis megalotis*	12.6	47.0		1
Longear sunfish	*Lepomis megalotis*	12.6	47.0		1
Longear sunfish	*Lepomis megalotis*	12.6	47.0		1
Longear sunfish	*Lepomis megalotis*	12.6	47.0		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Longear sunfish	*Lepomis megalotis*	12.6	47.0		1
Longear sunfish	*Lepomis megalotis*	9.5	17.0		1
Longear sunfish	*Lepomis megalotis*	9.5	17.0		1
Longear sunfish	*Lepomis megalotis*	9.5	17.0		1
Longear sunfish	*Lepomis megalotis*	9.5	17.0		1
Longear sunfish	*Lepomis megalotis*	9.5	17.0		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.5	24.4		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	10.1	18.3		1
Longear sunfish	*Lepomis megalotis*	14.5	47.5		2
Longear sunfish	*Lepomis megalotis*	14.3	48.0		2
Longear sunfish	*Lepomis megalotis*	12.2	28.2		2
Longear sunfish	*Lepomis megalotis*	12.4	42.0		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Longear sunfish	*Lepomis megalotis*	12.0	35.6		2
Longear sunfish	*Lepomis megalotis*	10.5	22.4		2
Longear sunfish	*Lepomis megalotis*	10.5	22.4		2
Longear sunfish	*Lepomis megalotis*	10.5	22.4		2
Longear sunfish	*Lepomis megalotis*	10.5	22.4		2
Longear sunfish	*Lepomis megalotis*	10.5	22.4		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	10.5	22.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	8.7	12.0		2
Longear sunfish	*Lepomis megalotis*	11.0	23.5		2
Longear sunfish	*Lepomis megalotis*	8.0	9.0		2
Mosquitofish	*Gambusia affinis*	2.5	0.1	M	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6	F	1
Mosquitofish	*Gambusia affinis*	3.8	0.6		1
Mosquitofish	*Gambusia affinis*	3.8	0.6		1
Mosquitofish	*Gambusia affinis*	3.2	0.2		2
Mosquitofish	*Gambusia affinis*	4.0	0.7		2
Mosquitofish	*Gambusia affinis*	3.6	0.5		2
Mosquitofish	*Gambusia affinis*	3.8	0.5		2
Mosquitofish	*Gambusia affinis*	3.5	0.3		2
Mosquitofish	*Gambusia affinis*	2.7	0.1		2
Mosquitofish	*Gambusia affinis*	3.1	0.2		2
Mosquitofish	*Gambusia affinis*	2.1	0.1		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Mosquitofish	*Gambusia affinis*	3.3	0.3		2
Mosquitofish	*Gambusia affinis*	3.5	0.4		2
Mosquitofish	*Gambusia affinis*	3.4	0.4		2
Mosquitofish	*Gambusia affinis*	2.5	0.2		2
Mosquitofish	*Gambusia affinis*	2.5	0.2		2
Mosquitofish	*Gambusia affinis*	2.7	0.3		2
Mosquitofish	*Gambusia affinis*	2.1	0.1		2
Steelcolor shiner	*Cyprinella whipplei*	7.0	2.8		1
Steelcolor shiner	*Cyprinella whipplei*	6.5	2.2		1
Steelcolor shiner	*Cyprinella whipplei*	6.5	2.8		2
Suckermouth minnow	*Phenacobius mirabilis*	20.0	9.0		1
Suckermouth minnow	*Phenacobius mirabilis*	11.0	10.2		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	9.2	6.0		1
Suckermouth minnow	*Phenacobius mirabilis*	5.6	1.6		1
Suckermouth minnow	*Phenacobius mirabilis*	5.6	1.6		1
Suckermouth minnow	*Phenacobius mirabilis*	5.6	1.6		1
Suckermouth minnow	*Phenacobius mirabilis*	5.6	1.6		1
Suckermouth minnow	*Phenacobius mirabilis*	5.6	1.6		1
Suckermouth minnow	*Phenacobius mirabilis*	7.5	4.2		1
Suckermouth minnow	*Phenacobius mirabilis*	8.5	6.4		1
Suckermouth minnow	*Phenacobius mirabilis*	8.5	6.4		1
Suckermouth minnow	*Phenacobius mirabilis*	8.5	6.4		1
Suckermouth minnow	*Phenacobius mirabilis*	8.5	6.4		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	5.0	1.2		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	10.5	9.5		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
Suckermouth minnow	*Phenacobius mirabilis*	6.0	2.0		2
White sucker	*Catostomus commerson*	5.5	1.3		1
White sucker	*Catostomus commerson*	5.5	1.3		1
White sucker	*Catostomus commerson*	5.5	1.3		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 1 July 2010
Site: WFBCR2, 39.23606° N -87.36069°W
Reach Length: 150 meters, Shock time: 2,907 seconds

Common Name	*Genus Species*	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
White sucker	*Catostomus commerson*	5.5	1.3		1
White sucker	*Catostomus commerson*	5.5	1.3		1
White sucker	*Catostomus commerson*	5.2	1.5		2
White sucker	*Catostomus commerson*	5.2	1.5		2
White sucker	*Catostomus commerson*	5.2	1.5		2
White sucker	*Catostomus commerson*	5.2	1.5		2
White sucker	*Catostomus commerson*	5.2	1.5		2
Yellow bullhead	*Ameiurus natalis*	22.5	151.0		1
Yellow bullhead	*Ameiurus natalis*	22.0	153.0	F	1
Yellow bullhead	*Ameiurus natalis*	19.2	93.0		1
Yellow bullhead	*Ameiurus natalis*	20.0	120.0		1
Yellow bullhead	*Ameiurus natalis*	20.5	123.0		1
Yellow bullhead	*Ameiurus natalis*	17.0	61.0		1
Yellow bullhead	*Ameiurus natalis*	17.5	74.0		1
Yellow bullhead	*Ameiurus natalis*	4.8	1.0		1
Yellow bullhead	*Ameiurus natalis*	4.8	1.0		1
Yellow bullhead	*Ameiurus natalis*	4.8	1.0		1
Yellow bullhead	*Ameiurus natalis*	4.8	1.0		1
Yellow bullhead	*Ameiurus natalis*	5.0	1.5		1
Yellow bullhead	*Ameiurus natalis*	4.0	0.8		1
Yellow bullhead	*Ameiurus natalis*	24.0	188		2
Yellow bullhead	*Ameiurus natalis*	17.5	70		2
Yellow bullhead	*Ameiurus natalis*	14.5	33		2
Yellow bullhead	*Ameiurus natalis*	12.0	20		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	14.7	40		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	4.5	0.5		2
Yellow bullhead	*Ameiurus natalis*	2.5	0.5		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Blackstripe topminnow	*Fundulus notatus*	7.0	2.7		1
Blackstripe topminnow	*Fundulus notatus*	6.5	2.3		1
Blackstripe topminnow	*Fundulus notatus*	7.0	2.0		1
Blackstripe topminnow	*Fundulus notatus*	6.0	1.2		1
Blackstripe topminnow	*Fundulus notatus*	6.5	1.4		1
Blackstripe topminnow	*Fundulus notatus*	6.5	1.8		1
Blackstripe topminnow	*Fundulus notatus*	2.5	0.1		1
Blackstripe topminnow	*Fundulus notatus*	2.5	0.1		1
Blackstripe topminnow	*Fundulus notatus*	2.5	0.1		1
Blackstripe topminnow	*Fundulus notatus*	6	1.7		1
Bluegill sunfish	*Lepomis macrochirus*	16.0	68.2		1
Bluegill sunfish	*Lepomis macrochirus*	13.4	43.2		1
Bluegill sunfish	*Lepomis macrochirus*	13.9	45.0		1
Bluegill sunfish	*Lepomis macrochirus*	11.3	27.0		1
Bluegill sunfish	*Lepomis macrochirus*	15.2	62.9		1
Bluegill sunfish	*Lepomis macrochirus*	7.9	7.0		1
Bluegill sunfish	*Lepomis macrochirus*	13.2	38.2		1
Bluegill sunfish	*Lepomis macrochirus*	12.0	31.0		1
Bluegill sunfish	*Lepomis macrochirus*	10.5	19.6		1
Bluegill sunfish	*Lepomis macrochirus*	2.0	1.0		1
Bluegill sunfish	*Lepomis macrochirus*	2.4	0.1		1
Bluegill sunfish	*Lepomis macrochirus*	2.4	0.1		1
Bluegill sunfish	*Lepomis macrochirus*	2.4	0.1		1
Bluegill sunfish	*Lepomis macrochirus*	2.4	0.1		1
Bluegill sunfish	*Lepomis macrochirus*	2.4	0.1		1
Bluegill sunfish	*Lepomis macrochirus*	15.2	54.7		2
Bluegill sunfish	*Lepomis macrochirus*	12.5	33.7		2
Bluegill sunfish	*Lepomis macrochirus*	12	29.6		2
Bluegill sunfish	*Lepomis macrochirus*	13	44		2
Bluntnose minnow	*Pimephales notatus*	6.1	2.5		1
Bluntnose minnow	*Pimephales notatus*	6.5	2.6		1
bluntnose minnow	*Pimephales notatus*	7.2	3.0		1
bluntnose minnow	*Pimephales notatus*	7.8	8.0		1
bluntnose minnow	*Pimephales notatus*	6.6	2.3		1
bluntnose minnow	*Pimephales notatus*	6.4	1.2		1
bluntnose minnow	*Pimephales notatus*	6.4	1.2		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
bluntnose minnow	*Pimephales notatus*	6.4	1.2		1
bluntnose minnow	*Pimephales notatus*	6.4	1.2		1
bluntnose minnow	*Pimephales notatus*	8.3	5.0	M	1
Bluntnose minnow	*Pimephales notatus*	7.2	3.2		1
Bluntnose minnow	*Pimephales notatus*	7.2	3.2		1
Bluntnose minnow	*Pimephales notatus*	7.2	3.2		1
Bluntnose minnow	*Pimephales notatus*	7.2	3.2		1
Bluntnose minnow	*Pimephales notatus*	8	5.3		1
Bluntnose minnow	*Pimephales notatus*	6.7	3		1
Bluntnose minnow	*Pimephales notatus*	6.2	2.4		1
Bluntnose minnow	*Pimephales notatus*	6.5	2.6		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	3	0.5		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.6		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4	0.2		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4.5	0.5		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	4	0.4		1
Bluntnose minnow	*Pimephales notatus*	8.2	5.2		2
Bluntnose minnow	*Pimephales notatus*	6	*2.5*		2
Bluntnose minnow	*Pimephales notatus*	5.5	*2*		2
Bluntnose minnow	*Pimephales notatus*	6	*2.5*		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Bluntnose minnow	*Pimephales notatus*	5.5	*2*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Bluntnose minnow	*Pimephales notatus*	4.2	*0.63*		2
Creek chub	*Semotilus atromaculatus*	5.5	1.4		1
Creek chub	*Semotilus atromaculatus*	4.5	1		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	5.1	1.3		1
Creek chub	*Semotilus atromaculatus*	4.8	0.9		1
Creek chub	*Semotilus atromaculatus*	4.8	1		1
Creek chub	*Semotilus atromaculatus*	4.8	1		1
Creek chub	*Semotilus atromaculatus*	4.8	1		1
Creek chub	*Semotilus atromaculatus*	4.8	1		1
Creek chub	*Semotilus atromaculatus*	5	*1.1*		2
Creek chub	*Semotilus atromaculatus*	4.5	*0.95*		2
Green sunfish	*Lepomis cyanellus*	13.9	49.0		1
Green sunfish	*Lepomis cyanellus*	11.8	25.5		1
Green sunfish	*Lepomis cyanellus*	10.6	19.2		1
Green sunfish	*Lepomis cyanellus*	10.1	16.5		1
Green sunfish	*Lepomis cyanellus*	8.1	8.2		1
Green sunfish	*Lepomis cyanellus*	3.0	1.0		1
Green sunfish	*Lepomis cyanellus*	3.0	1.5		1
Green sunfish	*Lepomis cyanellus*	9.8	15.5		2
Green sunfish	*Lepomis cyanellus*	9.6	12.5		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Largemouth bass	*Micropterus salmoides*	14.8	32.7		1
Largemouth bass	*Micropterus salmoides*	7.9	5.2		1
Largemouth bass	*Micropterus salmoides*	8.5	7.0		1
Largemouth bass	*Micropterus salmoides*	5.8	2.7		1
Largemouth bass	*Micropterus salmoides*	7.5	5.6		1
Largemouth bass	*Micropterus salmoides*	6.5	3.8		1
Largemouth bass	*Micropterus salmoides*	6.0	2.4		1
Largemouth bass	*Micropterus salmoides*	7.0	4.8		1
Largemouth bass	*Micropterus salmoides*	5.8	3.0		1
Largemouth bass	*Micropterus salmoides*	6.2	4.2		1
Largemouth bass	*Micropterus salmoides*	6.0	3.6		1
Largemouth bass	*Micropterus salmoides*	7.1	3.9		1
Largemouth bass	*Micropterus salmoides*	6.0	1.2		1
Largemouth bass	*Micropterus salmoides*	8.0	5.0		1
Largemouth bass	*Micropterus salmoides*	7.0	3.3		1
Largemouth bass	*Micropterus salmoides*	5.2	1.6		1
Largemouth bass	*Micropterus salmoides*	4.7	0.6		1
Longear sunfish	*Lepomis megalotis*	10.0	22.0		1
Longear sunfish	*Lepomis megalotis*	11.0	28.7		1
Longear sunfish	*Lepomis megalotis*	12.2	39.4		1
Longear sunfish	*Lepomis megalotis*	9.7	1.7		1
Longear sunfish	*Lepomis megalotis*	14.1	58.6		1
Longear sunfish	*Lepomis megalotis*	12.9	46.0		1
Longear sunfish	*Lepomis megalotis*	10.0	21.0		1
Longear sunfish	*Lepomis megalotis*	10.9	24.5		1
Longear sunfish	*Lepomis megalotis*	10.0	21.4		1
Longear sunfish	*Lepomis megalotis*	9.5	18.0		1
Longear sunfish	*Lepomis megalotis*	11.2	28.2		1
Longear sunfish	*Lepomis megalotis*	13.2	40.0		1
Longear sunfish	*Lepomis megalotis*	9.6	17.3		1
Longear sunfish	*Lepomis megalotis*	9.6	17.0		1
Longear sunfish	*Lepomis megalotis*	11.0	23.0		1
Longear sunfish	*Lepomis megalotis*	12.0	34.5		1
Longear sunfish	*Lepomis megalotis*	10.4	22.3		1
Longear sunfish	*Lepomis megalotis*	10.0	18.5		1
Longear sunfish	*Lepomis megalotis*	9.6	16.0		1
Longear sunfish	*Lepomis megalotis*	10.7	19.9		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Longear sunfish	*Lepomis megalotis*	7.5	6.7		1
Longear sunfish	*Lepomis megalotis*	11.2	23.5		1
Longear sunfish	*Lepomis megalotis*	10.0	17.9		1
Longear sunfish	*Lepomis megalotis*	11.3	29.0		1
Longear sunfish	*Lepomis megalotis*	10.3	22.7		1
Longear sunfish	*Lepomis megalotis*	9.5	16.2		1
Longear sunfish	*Lepomis megalotis*	15.2	58		2
Longear sunfish	*Lepomis megalotis*	12	33.4		2
Longear sunfish	*Lepomis megalotis*	9.8	19.1		2
Longear sunfish	*Lepomis megalotis*	11	23.9		2
Longear sunfish	*Lepomis megalotis*	10	22.9		2
Longear sunfish	*Lepomis megalotis*	12.8	40.5		2
Longear sunfish	*Lepomis megalotis*	9.3	15.4		2
Longear sunfish	*Lepomis megalotis*	7.5	4.3		2
Longear sunfish	*Lepomis megalotis*	7.5	4.3		2
Longear sunfish	*Lepomis megalotis*	5.5	1.7		2
Longear sunfish	*Lepomis megalotis*	5.5	1.7		2
Mosquitofish	*Gambusia affinis*	4.0	1.0		1
Mosquitofish	*Gambusia affinis*	4.7	1.5		1
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	2.5	0.1		1
Mosquitofish	*Gambusia affinis*	3	0.5		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	3	0.5		1
Mosquitofish	*Gambusia affinis*	5.2	*1.2*		2
Mosquitofish	*Gambusia affinis*	3.5	*0.54*		2
Quillback	*Carpiodes cyprinus*	7.9	6.2		1
Quillback	*Carpiodes cyprinus*	8.5	7.8		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	8.1	5.2		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	7.4	3.0		1
Silverjaw minnow	*Notropis buccatus*	8.0	3.5		1
Silverjaw minnow	*Notropis buccatus*	8.0	3.5		1
Silverjaw minnow	*Notropis buccatus*	8.0	3.5		1
Silverjaw minnow	*Notropis buccatus*	4.8	1		1
Silverjaw minnow	*Notropis buccatus*	4.8	1		1
Silverjaw minnow	*Notropis buccatus*	4.8	1		1
Silverjaw minnow	*Notropis buccatus*	4.8	1		1
Silverjaw minnow	*Notropis buccatus*	4.8	1		1
Silverjaw minnow	*Notropis buccatus*	8	3.8		2
Silverjaw minnow	*Notropis buccatus*	4.8	0.8		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Silverjaw minnow	*Notropis buccatus*	4.5	*0.41*		2
Silverjaw minnow	*Notropis buccatus*	4.5	*0.41*		2
Spotted sunfish	*Lepomis punctatus*	10.9	22.7		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	9.0	6.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	1		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	5	0.8		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	4.8	0.9		1
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	5.2	1.8		2
Suckermouth minnow	*Phenacobius mirabilis*	3.2	*0.3*		2
Suckermouth minnow	*Phenacobius mirabilis*	6	*2.5*		2
Suckermouth minnow	*Phenacobius mirabilis*	9.5	7.8		2
Suckermouth minnow	*Phenacobius mirabilis*	9.5	7.8		2
Suckermouth minnow	*Phenacobius mirabilis*	9.5	7.8		2
Suckermouth minnow	*Phenacobius mirabilis*	9.5	7.8		2

West Fork Busseron Creek Fish Survey Results

Sample Date: 30 June 2010
Site: WFBCR3, 39.23132° N -87.35915°W
Reach Length: 150 meters, Shock time: 3,688 seconds

Common Name	Genus Species	Total Length (cm)	Weight (g)	Sex (M/F)	Pass No.
Yellow bullhead	*Ameiurus natalis*	18.5	89		1
Yellow bullhead	*Ameiurus natalis*	17	66		1
Yellow bullhead	*Ameiurus natalis*	14	33.5		1
Yellow bullhead	*Ameiurus natalis*	15	40		1
Yellow bullhead	*Ameiurus natalis*	12.5	25.2		1
Yellow bullhead	*Ameiurus natalis*	5.3	1.0		1
Yellow bullhead	*Ameiurus natalis*	11.0	18.8		1
Yellow bullhead	*Ameiurus natalis*	5.5	3.0		1
Yellow bullhead	*Ameiurus natalis*	4.5	1.7		1
Yellow bullhead	*Ameiurus natalis*	3.2	1.2		1
Yellow bullhead	*Ameiurus natalis*	4.2	1.6		1
Yellow bullhead	*Ameiurus natalis*	3.0	0.6		1
Yellow bullhead	*Ameiurus natalis*	4.3	1.0		1
Yellow bullhead	*Ameiurus natalis*	4.0	1.4		1
Yellow bullhead	*Ameiurus natalis*	2.5	0.1		1
Yellow bullhead	*Ameiurus natalis*	4.6	0.5		1
Yellow bullhead	*Ameiurus natalis*	4.8	2.0		1
Yellow bullhead	*Ameiurus natalis*	11	18.2		2
Yellow bullhead	*Ameiurus natalis*	12	20.5		2
Yellow bullhead	*Ameiurus natalis*	12	24.4		2
Yellow bullhead	*Ameiurus natalis*	18	19		2
Yellow bullhead	*Ameiurus natalis*	18	74.6		2
Yellow bullhead	*Ameiurus natalis*	4.5	1		2
Yellow bullhead	*Ameiurus natalis*	3.5	0.7		1

1. Values in italics were estimated based on weight/length relationship.

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are NOT adjusted for subsampling

ECOANALYSTS, INC.

		Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
		Site	WFBCU1	WFBCR2	WFBCR3
		Date	06-29-2010	06-29-2010	06-29-2010
		Device	3m2	3m2	3m2
		Habitat	Riffle	Riffle	Riffle
		Percent Subsampled	100.00	6.25	22.94
		EcoAnalysts Sample ID	5508.1-1	5508.1-2	5508.1-3
Ephemeroptera	Baetidae		0	0	1
	Caenis sp.		1	1	8
	Tricorythodes sp.		0	0	1
Odonata	Argia sp.		0	0	1
	Coenagrionidae		1	0	40
Hemiptera	Corixidae		0	0	1
Coleoptera	Berosus sp.		0	2	43
	Coptotomus sp.		0	0	1
	Dubiraphia sp.		1	0	0
	Peltodytes sp.		0	0	3
	Tropisternus sp.		0	0	1
Megaloptera	Sialis sp.		2	0	0
Diptera-Chironomidae	Ablabesmyia mallochi		0	0	3
	Cladotanytarsus sp.		1	0	0
	Cricotopus bicinctus gr.		0	25	3
	Cricotopus sp.		0	0	2
	Cryptochironomus sp.		9	8	0
	Dicrotendipes neomodestus		4	36	21
	Dicrotendipes simpsoni		0	1	2
	Endochironomus sp.		0	1	2
	Glyptotendipes sp.		0	45	17
	Harnischia sp.		0	0	1
	Labrundinia sp.		0	0	1
	Parachironomus sp.		0	1	3
	Polypedilum flavum		10	6	8
	Polypedilum halterale gr.		0	1	0

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are NOT adjusted for subsampling

EcoAnalysts, Inc.

	Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
	Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
	Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
	Device	**3m2**	**3m2**	**3m2**
	Habitat	**Riffle**	**Riffle**	**Riffle**
	Percent Subsampled	**100.00**	**6.25**	**22.94**
	EcoAnalysts Sample ID	**5508.1-1**	**5508.1-2**	**5508.1-3**
	Polypedilum scalaenum gr.	1	1	0
	Pseudochironomus sp.	0	97	6
	Rheotanytarsus exiguus gr.	0	21	7
	Saetheria tylus	1	0	0
	Stictochironomus sp.	1	0	0
	Thienemannimyia gr. sp.	4	1	4
Diptera	Bezzia/Palpomyia sp.	8	0	0
	Dolichopodidae	0	0	1
	Erioptera sp.	0	1	0
	Hedriodiscus/Odontomyia sp.	1	0	1
	Sciomyzidae	0	0	1
	Simulium sp.	0	0	2
	Tabanidae	1	0	0
	Tipulidae	0	0	1
Trichoptera	Cheumatopsyche sp.	68	10	12
	Hydroptila sp.	0	4	40
	Oxyethira sp.	0	0	1
Gastropoda	Fossaria sp.	2	0	10
	Helisoma anceps	1	0	0
	Physa sp.	0	0	40
	Planorbidae	0	2	0
Bivalvia	Sphaeriidae	19	0	0
	Utterbackia sp.	1	0	0
Annelida	Enchytraeidae	0	2	0
	Helobdella sp.	1	0	0
	Limnodrilus hoffmeisteri	0	16	0

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are NOT adjusted for subsampling

ECOANALYSTS, INC.

		Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
		Site	WFBCU1	WFBCR2	WFBCR3
		Date	06-29-2010	06-29-2010	06-29-2010
		Device	3m2	3m2	3m2
		Habitat	Riffle	Riffle	Riffle
		Percent Subsampled	100.00	6.25	22.94
		EcoAnalysts Sample ID	5508.1-1	5508.1-2	5508.1-3
	Pristina jenkinae		0	1	0
	Tubificidae w/o cap setae		0	0	2
Acari	Koenikea sp.		0	0	1
Crustacea	Cambaridae		2	0	0
	Hyalella sp.		0	0	3
	Orconectes sp.		0	0	1
Other Organisms	Nematoda		3	0	0
	Prostoma sp.		0	1	0
		TOTAL	**143**	**284**	**296**

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Riffle**	**Riffle**	**Riffle**
Percent Subsampled	**100.00**	**6.25**	**22.94**
EcoAnalysts Sample ID	**5508.1-1**	**5508.1-2**	**5508.1-3**
Abundance Measures			
Corrected Abundance	143.00	4544.00	1290.56
EPT Abundance	69.00	240.00	274.68
Dominance Measures			
Dominant Taxon	Cheumatopsyche sp.	Pseudochironomus sp.	Berosus sp.
Dominant Abundance	68.00	1552.00	187.48
2nd Dominant Taxon	Sphaeriidae	Glyptotendipes sp.	Physa sp.
2nd Dominant Abundance	19.00	720.00	174.40
3rd Dominant Taxon	Polypedilum flavum	Dicrotendipes neomodestus	Coenagrionidae
3rd Dominant Abundance	10.00	576.00	174.40
% Dominant Taxon	47.55	34.15	14.53
% 2 Dominant Taxa	60.84	50.00	28.04
% 3 Dominant Taxa	67.83	62.68	41.55
Richness Measures			
Species Richness	23.00	23.00	38.00
EPT Richness	2.00	3.00	6.00
Ephemeroptera Richness	1.00	1.00	3.00
Plecoptera Richness	0.00	0.00	0.00
Trichoptera Richness	1.00	2.00	3.00
Chironomidae Richness	8.00	13.00	14.00
Oligochaeta Richness	0.00	3.00	1.00
Non-Chiro. Non-Olig. Richness	15.00	7.00	23.00

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Riffle**	**Riffle**	**Riffle**
Percent Subsampled	**100.00**	**6.25**	**22.94**
EcoAnalysts Sample ID	**5508.1-1**	**5508.1-2**	**5508.1-3**
Rhyacophila Richness	0.00	0.00	0.00
Community Composition			
% Ephemeroptera	0.70	0.35	3.38
% Plecoptera	0.00	0.00	0.00
% Trichoptera	47.55	4.93	17.91
% EPT	48.25	5.28	21.28
% Coleoptera	0.70	0.70	16.22
% Diptera	28.67	86.27	29.05
% Oligochaeta	0.00	6.69	0.68
% Baetidae	0.00	0.00	0.34
% Brachycentridae	0.00	0.00	0.00
% Chironomidae	21.68	85.92	27.03
% Ephemerellidae	0.00	0.00	0.00
% Hydropsychidae	47.55	3.52	4.05
% Odonata	0.70	0.00	13.85
% Perlidae	0.00	0.00	0.00
% Pteronarcyidae	0.00	0.00	0.00
% Simuliidae	0.00	0.00	0.68
Functional Group Composition			
% Filterers	60.84	10.92	7.09
% Gatherers	4.90	58.10	15.54
% Predators	19.58	3.52	17.23
% Scrapers	2.10	0.70	16.89

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Riffle**	**Riffle**	**Riffle**
Percent Subsampled	**100.00**	**6.25**	**22.94**
EcoAnalysts Sample ID	**5508.1-1**	**5508.1-2**	**5508.1-3**
% Shredders	7.69	12.32	20.95
% Piercer-Herbivores	0.00	1.41	14.19
% Unclassified	4.90	13.03	8.11
Filterer Richness	2.00	2.00	3.00
Gatherer Richness	6.00	9.00	12.00
Predator Richness	7.00	3.00	7.00
Scraper Richness	2.00	1.00	2.00
Shredder Richness	2.00	5.00	7.00
Piercer-Herbivore Richness	0.00	1.00	3.00
Unclassified	4.00	2.00	4.00
Diversity/Evenness Measures			
Shannon-Weaver H' (log 10)	0.88	0.93	1.22
Shannon-Weaver H' (log 2)	2.91	3.11	4.04
Shannon-Weaver H' (log e)	2.02	2.15	2.80
Margalef's Richness	4.43	2.61	5.17
Pielou's J'	0.64	0.69	0.77
Simpson's Heterogeneity	0.75	0.82	0.91
Biotic Indices			
% Indiv. w/ HBI Value	90.91	99.65	98.65
Hilsenhoff Biotic Index	5.67	6.65	7.18
% Indiv. w/ MTI Value	78.32	44.72	44.93
Metals Tolerance Index	4.38	4.02	3.74
% Indiv. w/ FSBI Value	48.95	4.93	18.58

ENVIRON IN Stream Restoration Benthos 2010 (Riffles)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Riffle**	**Riffle**	**Riffle**
Percent Subsampled	**100.00**	**6.25**	**22.94**
EcoAnalysts Sample ID	**5508.1-1**	**5508.1-2**	**5508.1-3**
Fine Sediment Biotic Index	3.00	7.00	14.00
FSBI - average	0.13	0.30	0.37
FSBI - weighted average	1.97	2.86	4.25
% Indiv. w/ TPM Value	60.14	23.94	28.38
Temp. Pref. Metric - average	0.39	0.57	0.74
TPM - weighted average	1.17	1.79	2.04
Other Metrics			
Long-Lived Taxa Richness	2.00	0.00	1.00
Clinger Richness	6.00	7.00	16.00
% Clingers	52.45	38.03	48.31
Intolerant Taxa Richness	0.00	0.00	0.00
% Tolerant Individuals	1.54	0.44	6.76
% Tolerant Taxa	21.74	43.48	31.58
Coleoptera Richness	1.00	1.00	4.00

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are NOT adjusted for subsampling

ECOANALYSTS, INC.

		Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
		Site	WFBCU1	WFBCR2	WFBCR3
		Date	06-29-2010	06-29-2010	06-29-2010
		Device	3m2	3m2	3m2
		Habitat	Debris	Debris	Debris
		Percent Subsampled	100.00	12.50	7.29
		EcoAnalysts Sample ID	5508.2-1	5508.2-2	5508.2-3
Ephemeroptera	Baetis intercalaris		0	0	8
	Caenis sp.		4	1	1
Odonata	Argia sp.		1	0	0
	Boyeria vinosa		1	0	0
	Coenagrionidae		6	26	0
	Corduliidae		2	0	0
Coleoptera	Berosus sp.		0	16	11
	Dubiraphia sp.		3	0	0
	Enochrus sp.		0	1	0
	Helichus sp.		1	0	0
	Macronychus glabratus		1	0	0
	Neoporus sp.		1	0	0
	Peltodytes sp.		4	0	0
Diptera-Chironomidae	Ablabesmyia mallochi		4	1	0
	Chironomus sp.		1	0	0
	Clinotanypus sp.		1	0	0
	Cricotopus bicinctus gr.		0	1	3
	Cricotopus sp.		0	2	2
	Cryptochironomus sp.		1	0	10
	Cryptotendipes sp.		1	0	0
	Dicrotendipes neomodestus		1	39	21
	Dicrotendipes simpsoni		0	2	0
	Endochironomus sp.		0	6	0
	Glyptotendipes sp.		0	81	12
	Parachironomus sp.		0	11	0
	Paratendipes sp.		1	0	0

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are NOT adjusted for subsampling

ECOANALYSTS, INC.

		Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
		Site	WFBCU1	WFBCR2	WFBCR3
		Date	06-29-2010	06-29-2010	06-29-2010
		Device	3m2	3m2	3m2
		Habitat	Debris	Debris	Debris
		Percent Subsampled	100.00	12.50	7.29
		EcoAnalysts Sample ID	5508.2-1	5508.2-2	5508.2-3
	Phaenopsectra sp.		1	0	0
	Polypedilum flavum		0	10	31
	Polypedilum halterale gr.		0	0	2
	Polypedilum illinoense gr.		3	2	0
	Procladius sp.		2	0	0
	Pseudochironomus sp.		0	7	28
	Rheotanytarsus exiguus gr.		0	13	11
	Thienemannimyia gr. sp.		2	0	0
	Xenochironomus xenolabis		3	0	0
Diptera	Bezzia/Palpomyia sp.		5	1	1
	Ceratopogoninae		0	1	0
	Erioptera sp.		0	0	2
	Stratiomyidae		1	0	0
Trichoptera	Cheumatopsyche sp.		6	13	105
	Hydroptila sp.		1	7	7
	Oecetis sp.		0	1	0
Lepidoptera	Lepidoptera		1	0	0
Gastropoda	Fossaria sp.		11	5	2
	Gyraulus sp.		0	7	0
	Helisoma anceps		27	0	0
	Physa sp.		19	16	1
Bivalvia	Musculium sp.		0	0	1
	Pisidium sp.		20	0	0
Annelida	Erpobdella sp.		0	1	6
	Glossiphoniidae		1	0	0
	Lumbricina		1	0	0

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are NOT adjusted for subsampling

		Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
		Site	WFBCU1	WFBCR2	WFBCR3
		Date	06-29-2010	06-29-2010	06-29-2010
		Device	3m2	3m2	3m2
		Habitat	Debris	Debris	Debris
		Percent Subsampled	100.00	12.50	7.29
		EcoAnalysts Sample ID	5508.2-1	5508.2-2	5508.2-3
	Tubificidae w/o cap setae		0	0	14
Acari	Mideopsis sp.		1	0	0
	Neumania sp.		1	0	0
Crustacea	Cambaridae		0	2	1
	Hyalella sp.		0	1	0
	Ostracoda		0	2	0
		TOTAL	**140**	**276**	**280**

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Debris**	**Debris**	**Debris**
Percent Subsampled	**100.00**	**12.50**	**7.29**
EcoAnalysts Sample ID	**5508.2-1**	**5508.2-2**	**5508.2-3**
Abundance Measures			
Corrected Abundance	140.00	2208.00	3838.80
EPT Abundance	11.00	176.00	1658.91
Dominance Measures			
Dominant Taxon	Helisoma anceps	Glyptotendipes sp.	Cheumatopsyche sp.
Dominant Abundance	27.00	648.00	1439.55
2nd Dominant Taxon	Pisidium sp.	Dicrotendipes neomodestus	Polypedilum flavum
2nd Dominant Abundance	20.00	312.00	425.01
3rd Dominant Taxon	Physa sp.	Coenagrionidae	Pseudochironomus sp.
3rd Dominant Abundance	19.00	208.00	383.88
% Dominant Taxon	19.29	29.35	37.50
% 2 Dominant Taxa	33.57	43.48	48.57
% 3 Dominant Taxa	47.14	52.90	58.57
Richness Measures			
Species Richness	35.00	28.00	22.00
EPT Richness	3.00	4.00	4.00
Ephemeroptera Richness	1.00	1.00	2.00
Plecoptera Richness	0.00	0.00	0.00
Trichoptera Richness	2.00	3.00	2.00
Chironomidae Richness	12.00	12.00	9.00
Oligochaeta Richness	1.00	0.00	1.00
Non-Chiro. Non-Olig. Richness	22.00	16.00	12.00

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	W.F. Busseron Crk	W.F. Busseron Crk	W.F. Busseron Crk
Site	WFBCU1	WFBCR2	WFBCR3
Date	06-29-2010	06-29-2010	06-29-2010
Device	3m2	3m2	3m2
Habitat	Debris	Debris	Debris
Percent Subsampled	100.00	12.50	7.29
EcoAnalysts Sample ID	5508.2-1	5508.2-2	5508.2-3
Rhyacophila Richness	0.00	0.00	0.00
Community Composition			
% Ephemeroptera	2.86	0.36	3.21
% Plecoptera	0.00	0.00	0.00
% Trichoptera	5.00	7.61	40.00
% EPT	7.86	7.97	43.21
% Coleoptera	7.14	6.16	3.93
% Diptera	19.29	64.13	43.93
% Oligochaeta	0.71	0.00	5.00
% Baetidae	0.00	0.00	2.86
% Brachycentridae	0.00	0.00	0.00
% Chironomidae	15.00	63.41	42.86
% Ephemerellidae	0.00	0.00	0.00
% Hydropsychidae	4.29	4.71	37.50
% Odonata	7.14	9.42	0.00
% Perlidae	0.00	0.00	0.00
% Pteronarcyidae	0.00	0.00	0.00
% Simuliidae	0.00	0.00	0.00
Functional Group Composition			
% Filterers	18.57	9.42	41.79
% Gatherers	8.57	38.77	23.57
% Predators	21.43	10.87	3.93
% Scrapers	41.43	10.14	1.07

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Debris**	**Debris**	**Debris**
Percent Subsampled	**100.00**	**12.50**	**7.29**
EcoAnalysts Sample ID	**5508.2-1**	**5508.2-2**	**5508.2-3**
% Shredders	7.14	13.41	16.79
% Piercer-Herbivores	0.71	2.54	2.50
% Unclassified	2.14	14.86	10.36
Filterer Richness	2.00	2.00	3.00
Gatherer Richness	7.00	8.00	7.00
Predator Richness	14.00	5.00	2.00
Scraper Richness	4.00	3.00	2.00
Shredder Richness	5.00	6.00	4.00
Piercer-Herbivore Richness	1.00	1.00	1.00
Unclassified	2.00	3.00	3.00
Diversity/Evenness Measures			
Shannon-Weaver H' (log 10)	1.24	1.10	0.98
Shannon-Weaver H' (log 2)	4.13	3.64	3.26
Shannon-Weaver H' (log e)	2.86	2.52	2.26
Margalef's Richness	6.88	3.51	2.54
Pielou's J'	0.80	0.76	0.73
Simpson's Heterogeneity	0.91	0.87	0.82
Biotic Indices			
% Indiv. w/ HBI Value	72.86	98.91	96.79
Hilsenhoff Biotic Index	6.57	7.63	6.07
% Indiv. w/ MTI Value	29.29	31.52	55.36
Metals Tolerance Index	3.51	3.94	4.72
% Indiv. w/ FSBI Value	5.00	7.25	40.00

ENVIRON IN Stream Restoration Benthos 2010 (Multi Habitats)
Data are adjusted for subsampling

EcoAnalysts, Inc.

Water Body	**W.F. Busseron Crk**	**W.F. Busseron Crk**	**W.F. Busseron Crk**
Site	**WFBCU1**	**WFBCR2**	**WFBCR3**
Date	**06-29-2010**	**06-29-2010**	**06-29-2010**
Device	**3m2**	**3m2**	**3m2**
Habitat	**Debris**	**Debris**	**Debris**
Percent Subsampled	**100.00**	**12.50**	**7.29**
EcoAnalysts Sample ID	**5508.2-1**	**5508.2-2**	**5508.2-3**
Fine Sediment Biotic Index	7.00	7.00	7.00
FSBI - average	0.20	0.25	0.32
FSBI - weighted average	2.43	3.05	2.19
% Indiv. w/ TPM Value	11.43	17.75	56.79
Temp. Pref. Metric - average	0.29	0.64	0.64
TPM - weighted average	1.44	2.10	1.43
Other Metrics			
Long-Lived Taxa Richness	3.00	0.00	1.00
Clinger Richness	9.00	11.00	9.00
% Clingers	52.14	55.07	53.93
Intolerant Taxa Richness	1.00	0.00	0.00
% Tolerant Individuals	27.45	2.43	0.40
% Tolerant Taxa	34.29	42.86	22.73
Coleoptera Richness	5.00	2.00	1.00

Attachment 3
West Fork Busseron Creek Study Site Photographs

Figure 1. Site WFBCU1 riffle area looking upstream. Macroinvertebrate sampling area. West Fork Busseron Creek near County Road 2125N. June 29, 2010.

Figure 2. Site WFBCU1 riffle macroinvertebrate sampling. West Fork Busseron Creek near County Road 2124N. June 29, 2010.

Figure 3. Site WFBCR2 looking downstream. West Fork Busseron Creek within upper portion of mitigation area WFBCM. June 29, 2010.

Figure 4. Site WFBCR2 example riffle area. Macroinvertebrate dip net sampling. West Fork Busseron Creek mitigation area WFBCM. June 29, 2010.

Figure 5. Site WFBCR2. Near downstream end of study reach looking upstream. West Fork Busseron Creek mitigation area WFBCM. June 29, 2010.

Figure 6. Site WFBCR3. Middle of study reach looking upstream. West Fork Busseron Creek mitigation area WFBCM. June 29, 2010.

Figure 7. Site WFBCR3. Downstream end of study reach looking upstream. West Fork Busseron Creek mitigation area WFBCM. June 29, 2010.

Figure 8. Site WFBCR3. Macroinvertebrate vegetation/debris dam habitat sampling. West Fork Busseron Creek mitigation area WFBCM. June 29, 2010.

Figure 9. Site WFBCR2. Fish survey sunfish example. West Fork Busseron Creek mitigation area WFBCM. July 1, 2010.

Figure 10. Site WFBCR2. Fish survey largemouth bass example. West Fork Busseron Creek mitigation area WFBCM. July 1, 2010.

Figure 11. Site WFBCR2. Electrofishing West Fork Busseron Creek. Undercut bank habitat with many sunfish. July 1, 2010.

Figure 12. Site WFBCR2. Cattail bed habitat. Site for many sunfish, bass, and catfish specimens captured during electrofishing. West Fork Busseron Creek within mitigation area WFBCM. July 1, 2010.